

JACOB PALIS: THE MEASURE OF ACCOMPLISHMENT

AT THE CLOSE OF HIS SECOND TERM AS TWAS PRESIDENT, THE BRAZILIAN MATHEMATICIAN REFLECTS ON THE ACADEMY'S IMPACT – AND ON THE NEED TO DO MORE.

As Jacob Palis was closing out his second term as president of TWAS, he could calculate his accomplishment in various ways: The heads of state he had met, the number of presentations he made at the highest levels of global science policy, or perhaps the distances he covered travelling the world as a scientist. But the Brazilian mathematician was focused on a different set of measures: the numbers of fellowships and exchanges, the number of research grants, and the opportunities created for young scientists.

For Palis these metrics are critical building blocks of development. When you train young scientists and have them go to different nations, he says, you are preparing a new generation for leadership in research, policy and

science promotion across the developing world.

Clearly, the trend during Palis' presidency at TWAS points to a strong positive impact:

- **Postdoctoral fellowships:** up 58.3%, from 35 in 2009 to 56 in 2012;
- **Postdoctoral awards:** up 29.4%, from 34 in 2007 to 44 in 2011;
- **PhD Fellowships** under the Organization for Women in Science for the Developing World: more than doubled, from 22 in 2009 to 46 in 2012;
- **Postgraduate fellowships:** up 18.2%, from 66 in 2009 to 78 in 2012;
- **Postgraduate awards:** up 102.6%, from 39 in 2007 to 79 in 2011;
- **Research grants:** up 88.9%, from 45 in 2009 to 85 in 2012.



“We are very proud of the TWAS programmes for graduate and postdoctoral fellowships”, Palis allowed in a recent telephone interview. “But our programmes could be much larger and they could probably have even better quality.

“It’s a question of organizing ourselves better in operations and logistics, finding the best candidates and getting the applications. I am confident that if we have even twice as many good candidates, then the countries that provide such fellowships – Brazil, China, India, Mexico and so on – would be happy to accept them.”

Other central challenges remain as well, he said: supporting more women in science and engineering, for example, and improving TWAS’s digital communications capacity. And, after years of being kindly housed by the Abdus Salam International Centre for Theoretical Physics (like TWAS, founded by Pakistani Nobel laureate Abdus Salam), it is time for TWAS to have its own quarters, as is common with academies of science in Europe.

THE POWER OF TRAVEL

Palis was born in Uberaba, in the interior of the Brazilian state of Minas Gerais. After receiving an undergraduate degree at the Federal University of Rio de Janeiro, he went to the University of California at Berkeley, where he received a PhD and later a postdoctoral fellowship. As a mathematician, his work initially focused on global stability of dynamical

systems, and later on bifurcations and fractal dimensions, and the global scenario for chaotic systems.

In 2010, he was awarded the prestigious Balzan Prize for mathematics. The judges recognized not only his “fundamental contributions to the mathematical theory of dynamical systems”, but also his work as adviser to more than 40 doctoral students, from 10 countries, across two or three generations.

Russia, Chile, India, Mexico, Italy (Lincei), Portugal and others.

His insight into the importance of exchange programmes undoubtedly reflects his own years as an exchange scholar in the United States.

The year was 1964. Palis was due to go to the US to study, but under Brazil’s military government, fellowships were suspended. With a sense of urgency, Palis applied for a Fulbright Scholar-



Palis has served as adviser for generations of PhD students. From left to right: E. Pujals, C. Moreira, A. Avila, J. Palis, W. de Melo and J.C. Yoccoz. Pujals, Moreira and de Melo are top-level former PhD students, and Avila is a former PhD student of de Melo. Yoccoz is a 1994 Fields Medalist who has frequently collaborated with Palis.

Since 2007, Palis has served as the president of the Brazilian Academy of Sciences. But over the span of his career, Palis has been a truly international scholar. He was elected a TWAS Fellow in 1991; before his election as the Academy’s president, he served as its secretary-general from 2001 to 2006.

He is a member of the national academies of sciences in Brazil, the United States, France, Germany,

ship. He received it, and departed for Berkeley.

The openness of campus culture and merit-based assessments of his work changed how he saw the world – and how he saw the relationships between science, government and culture. When he returned home in 1968, he became close to a colleague, physicist Sergio Rezende, who had just returned from MIT.



New TWAS president Chunli Bai with outgoing president Jacob Palis.

“The two of us, plus a few other people, started having discussions with some more senior scientists about the importance of being open to the world”, Palis recalls. “This was amazing for that time, because we did not have a lot of resources. We certainly had good scientists, but not so many. And we were just young kids.”

Their discussions yielded a document that was intended as a reflection of their time abroad, but it evolved into a relevant contribution to Brazilian international scientific cooperation.

Both men were launched into their careers. Rezende in time would become Brazil’s minister of science and technology, and, like Palis, he was later elected a TWAS Fellow.

But the lessons of their time abroad and their return home linger. Says Palis: “This is a major point: to be open to talents from other countries. And this is true for every country. There is always a country that’s less developed than

yours. And it’s very important to be open to all countries, including the less developed ones.

“This way, the visitors have a chance to inherit the professional values of science that are common in more developed countries. When they return home, they can talk to their colleagues, or even to politicians, about the importance of science and technology for the sake of their society.”

THINKING BIG

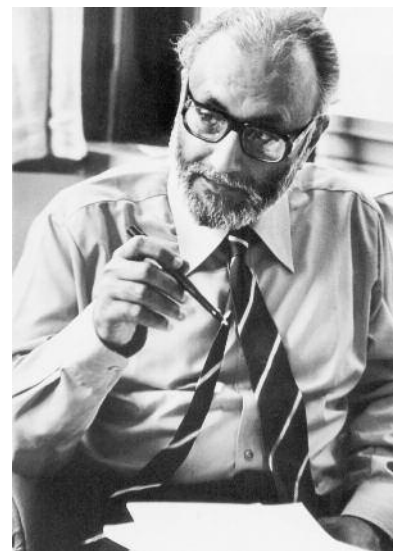
As he became involved with TWAS, Palis met Abdus Salam, the Nobel laureate and the Academy’s founder. Salam had some important advice: “My son, think big!”

“I was privileged to hear that from him”, Palis recalled in the interview. “I was not the only one – other friends had the same experience. He put in our heads the idea of being ambitious enough to pursue big, impossible dreams. How to open our own countries, our own institutions, to the world.”

And over the course of nearly 30 years, TWAS has changed the world, Palis said. The numbers of fellowships and research grants are just one measure. But there is also the way in which nations welcome the TWAS General Meeting, or the way in which developing countries – from China, India and Brazil to South Africa and Malaysia – have embraced science as a means for improving people’s lives.

In the years of his presidency, TWAS took other major evolutionary steps: developing and expanding its five regional offices, and creating new prizes to honour and encourage ambitious research. Meanwhile, TWAS has been able to expand its endowment fund by 46.4%, from USD9.5 million at the end of 2006 to just under USD14 million at the end of 2012.

But Palis declines to take personal credit. He points to the entire team of leaders and staff, and especially to the government of Italy



Abdus Salam

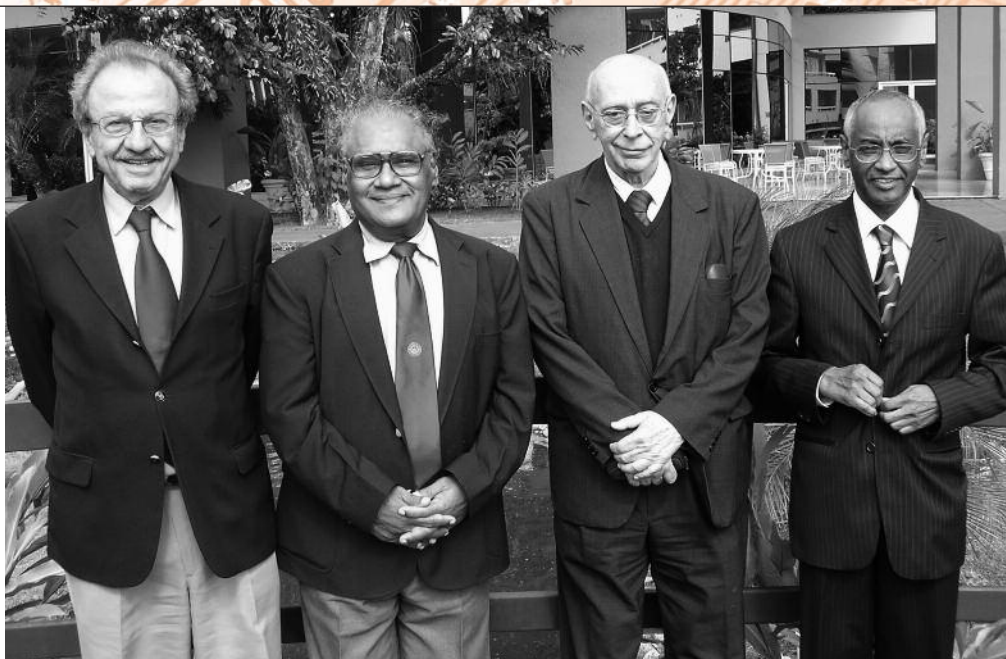
and others, including Brazil, China, India, Kuwait and Sweden (through the Swedish International Development Cooperation Agency, or SIDA), which have provided the financial support that has allowed TWAS to pursue big dreams. His predecessor as president, C.N.R. Rao; former secretary-general D. Balasubramanian; and former treasurer José Luis Morán-López have played critically important roles, he says. Incoming president Bai Chunli, secretary-general A.K. Sood, executive director Romain Murenzi and former executive director/current treasurer Mohamed H.A. Hassan are also very well-prepared to continue the progress, certainly with innovative steps.

FOR THE SAKE OF SOCIETY

For today's leaders, and for the future, Palis sees a fundamental challenge: TWAS can do more – in doctoral, post-doctoral and visiting fellowships and other areas.

A crucial area of concern is recruiting and supporting women into TWAS programmes and as members, Palis says. Since he took office at the start of 2007, the proportion of women among TWAS members has risen from 6% (51 out of 839 members) in 2006 to 9% (98 of 1,071 members) today. And TWAS this year received a grant from the Swedish International Development Cooperation Agency that will allow the Organization for Women in Science for the Developing World to support additional fellowships for women.

"The situation is better than before", Palis says, "but we have to



From left: Former TWAS presidents Jacob Palis, C.N.R. Rao and José I. Vargas; and TWAS treasurer Mohamed H.A. Hassan.

continue our efforts. Life can be more complex for women, in that they often provide most care for the children. But by no means do they have less talent. The whole world now recognizes this fact."

TWAS also needs to upgrade its digital and online systems to allow for electronic applications for fellowships, grants and other programmes. "It used to be true that computers were not available in certain countries in the developing world", Palis said. "But that's not true any more."

And, finally, a more complex challenge: finding a range of ways to engage scientists to continue to work in their home countries, building science communities there while also building vibrant international networks. Sometimes that means allowing scientists to maintain a relationship with colleagues from the country where

they obtained their doctoral degree or held a post-doctoral position even after they return home. Sometimes it may mean appealing to their idealism, what Palis calls their sense of solidarity with colleagues in the developing world.

"They don't do it for more salary or other rewards", he says. "They do it because they believe in the importance of it for the social advancement and well-being of their people. The way I see it, it's *magic*. It's the same magic in India and China and Brazil and Mexico and other countries. That's what allows us to have our best scientists engaged in promoting science and technology at the local level, in their own countries and other countries, for the sake of their societies." ■

◆ Edward W. Lempinen